**Table 6-1: WRIA 8 Technical Committee Monitoring Recommendations, Total cost: $1,853,000**

| Type of Monitoring | Recommended Monitoring | How are projects being funded currently? | How much will it cost? (Planning estimates, only) | Committee Tasks for Coordination During Plan Implementation |
|---|---|---|---|---|
| **Direct Effectiveness*** <br>• **Did the habitat action(s) achieve the desired habitat condition?** <br><br>• **Are fish present and how are they using the reach?** | Key project types to monitor - necessary: <br>1. Levee setbacks/floodplain reconnection <br>2. lakeshore modification <br>3. Large Woody Debris (LWD) <br>4. Pool habitat creation <br>5. Reducing fine sediment <br>6. Riparian restoration <br>7. Improving water quality <br>8. Management of exotic species <br><br>Educational actions <br>To be determined based on action plan <br><br>Land-use actions <br>Sub-meter Multi-spectral analyses - necessary | • There is currently no consistent monitoring program to evaluate the effectiveness of projects or to improve designs. The limited monitoring that is currently conducted at the project scale is usually a permit condition or qualitative/semi-quantitative assessment of individual projects by the implementing entity. <br><br>• Educational programs are being evaluated on a project basis. One of the more comprehensive evaluation programs is with the Natural Yard Care program. <br><br>• It is unknown of any land-use actions currently being monitored in any comprehensive fashion. | • Sample by project type – per SRFB, costs range from $4,000 (rip-rap removal) to $175,000 (off-channel habitats and wetlands) <br><br>If assume approx. 15% of project costs, total $600,000 <br><br>• This will depend on plan actions <br><br>• Current King County sub-meter multi-spectral surveys cost approximately $320,000 (cost covered in cumulative effectiveness) <br><br>**Total Direct Effectiveness Cost $600,000** | • In 2004, the Salmon Recovery Funding Board (SRFB) initiated a contract for a direct effectiveness monitoring strategy for types of projects funded by the SRFB. WRIA 8 Oversight Committee should request that urban projects be included in that program. WRIA 8 Technical Committee should coordinate monitoring protocols and results with the SRFB staff. <br><br>• The Outreach Committee should encourage local stewardship programs to conduct these project evaluations. <br><br>• The Oversight and Technical Committees should contact local governments and universities conducting multi-spectral analyses to jointly conduct these analyses. |
| **Cumulative Effectiveness:*** <br><br>**Chinook** <br><br>• **Is freshwater survival improving for each independent chinook salmon population?** <br><br><br><br><br>• **Have changes to habitat improved egg to outmigrant survival?** | 1) **Smolt trapping:** <br>• Cedar River, Bear Creek – necessary <br>• Kelsey Creek – desired <br>• Issaquah Creek – recommended depends on role of Issaquah hatchery fish in recovery <br><br>2) **Juvenile migration survival** <br>• Bear/Iss/Cedar to locks– necessary <br>• Intermediate locations (lake/ship canal) – recommended | 1. Smolt trapping: $100,000 annually each for Bear and Cedar ($200,000 annual total). Past and current funding from King County and Seattle primarily. For this year (2004), King County gave $100K for Bear, while Seattle gave $41,300 from the Cedar HCP and $60K of other funds for the Cedar trap. Currently, in 2005, King County plans to provide approx $40-$50K, pending budget. Seattle (Cedar HCP funds) plans to provide another $41,300. That means that WDFW will need funding for at least half the cost of operations of the traps in 2005. Seattle, through the HCP, will continue funding about $41-42K until 2008, then funding of the trap will be reduced for some years and not funded at all in others. So, basically funding of the traps will become uncertain in 2005 and beyond, as only limited funds exist 2005-2008, and funding will become even more uncertain past 2008. <br><br>2. juvenile migration - PIT tagging. A less intensive effort, tagging only at the mouth of Bear and the Cedar, costs approximately $30,000. That includes about $30,000 for 7,000 tags, PIT readers, and reporting. The Corps and Seattle are planning to ensure that this minimal PIT tag effort occurs in 2005; however, funding for this effort will not occur under the Lake Washington GI (west) beyond 2005. Obviously the $30K figure relies upon WDFW operating the smolt traps. A more intensive effort in 2003 was about $215K, on top of the smolt trapping. There is currently no local funding for this effort. | • Smolt traps – $200,000- $300,000 annually NOTE: funding needed for 2005 <br><br>• Juvenile migration – $30,000 – 215,000 annually NOTE: funding needed for 2006 | • Smolt Traps & Spawner surveys Oversight Com work with co-managers and federal entities for stock assessment by individual populations. Work to stabilize state/fed funding for smolt traps and spawner surveys by populations. Technical Committee work with co-managers to coordinate local monitoring protocols and efforts. <br>. <br><br>• Juvenile migration – Oversight and Tech. request continued monitoring by USACOE, NOAA Fisheries, and WDFW. Currently funded by US Army Corp and individual WRIA partners. <br><br>Oversight Com should request continued support from USFW for juvenile surveys. |

*At all levels of monitoring and evaluation, data management resources will be necessary for the following tasks: statistical design of habitat and population monitoring, regional data sharing, consistent protocols, QA/QC of data collection and analysis. Costs do NOT include regional data management costs.

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| • **Is the distribution of spawning chinook by population increasing into other reaches or satellite basins?** | 3) **Juvenile snorkel index reaches**<br>index reaches in various locations around Lake Washington - recommended<br><br>4) **Salmon spawner surveys**<br>Cedar mainstem, Bear, Cottage Lk Cr. - necessary<br><br>Lower Rock, Issaquah, North, Little Bear, Kelsey, Evans, E. Fork Issaquah - recommended<br><br>5) Salmonwatcher Observations all streams - recommended | 3. Snorkel Surveys – USFish & Wildlife (USFW) and the Cities of Seattle and Mercer Island have been sponsoring snorkel surveys for index reaches in Lake Washington. Annual cost estimates, using agency and jurisdiction staff, is approximately $35,000.<br><br>4. Adult spawning surveys. Roughly $120-150K per year, with exact costs depending on the run size. This covers Seattle and WDFW work on the mainstem Cedar, King County and WDFW on the Cedar tribs, and King County and WDFW on the north lake washington tribs and Bellevue for Kelsey. In the past, the Cedar River HCP Instream Flow Commission and Anadromous Fish Committee have given about $20K (in 2001), with remaining funds from King County and KCD in that year. WRIA KCD and King County have been the primary funders since 2002. In late 2003, WRIA 8 approved KCD funds $108,394 for the 2004 Chinook surveys. Future funding is looking rather tenuous. Additional surveys are needed in satellite streams and tributaries.<br><br>5.The Salmonwatcher Program is currently funded by a combination of individual jurisdictions providing staff and materials and a WRIA King Conservation District grant. | • Juvenile index snorkel surveys - $35,000 for field work and limited data processing<br><br>• Spawning Surveys - $200,000 annually<br>NOTE: Funding needed for 2005<br><br>• Salmonwatcher Volunteer Program – $75,000<br><br>**Total Annual Chinook Cumulative Monitoring Costs $540,000- $825,000** | Spawning surveys – see above<br><br>The Technical Committee and local stewardship programs should coordinate protocols, data, and volunteer efforts for the Salmonwatcher program |
| **Cumulative Effectiveness:**<br><br>**Habitat**<br><br>**Are basin level habitat attributes, such as forest cover, impervious surfaces, riparian forests, etc. improving as anticipated by implementation of the actions within the plan?** | • Multi-spectral analysis - high altitude preferred over landsat for both basin and jurisdictional level analyses - necessary<br>a. Forest cover<br>b. Impervious Area<br>c. Riparian forest cover<br><br>• Field assessment – EMAP - necessary<br>a. Habitat<br>b. Macroinvertebrates<br>c. Algae<br>d. Water quality<br>e. Fish assemblages<br><br>• Flow gauges<br>a. peak flows<br>b. low flows<br>c. flashiness<br>maintain existing permanent gauges - necessary | The 2004 watershed assessment utilized existing Tri-County landsat data (Original landsat analysis costs for King County were $245,670) with Snohomish County providing technical staff for GIS analysis and oversight. Estimated cost for landsat analysis without reports was $30,000 Snohomish County staff time. King County recently completed a high altitude multispectral flight (as compared to landsat) for approximately $320,000.<br><br>Field assessments – field assessments are being conducted by individual jurisdictions using various protocols and analysis tools. The macroinvertebrate indicators, using B-IBI, uses a standard protocol and analysis technique. Otherwise, there is currently no consistent baseline information for in-stream habitat or riparian condition across basins. An example of costs for B-IBI is approximately $15,000 for 13 sites, including taxonomy, analysis, and reporting (Bellevue).<br><br>Flows are currently being measured by USGS gauging stations and individual jurisdictions. Protocols for installation, operations, and reporting vary. USGS has a standard data and reporting format and data are available and transparent. Estimated annual operation costs for USGS stations are $14,000. Installation of telemetry for real-time data is approximately $13,000. | Multi-spectral every 5 years $246,000 – $320,000 (averaged at $49,200-64,000 per year)<br><br>EMAP costs based on Oregon Dept. Environmental Quality (ODEQ) estimate $350,000 per watershed for full EMAP protocols, including data compilation and staff costs. Without the fish assemblage section of EMAP, estimates are approximately $200,000 per watershed.<br><br>Flows -- USGS costs estimate flow gauging stations cost $14,000 per gauge annually. There are no new permanent gauges recommended at this time.<br><br>**Total Annual Cumulative Habitat Monitoring Costs $413,200-428,000** | • WRIA 8 Oversight Com. should request that WRIA 8 be included as an urban example for the Governor's Salmon Team recommendations for a comprehensive watershed monitoring strategy. This included a recommendation for intensive monitoring of target watersheds for cumulative effects for habitat.<br><br>• Oversight Committee should encourage local governments to continue funding existing permanent flow gauging stations. |

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